

ANNEXURE - K

Online Dissolved Gas (Multi-gas) and Moisture Analyser (Applicable as per BPS)

- 1.1. Online Dissolved Gas (Multi-gas) and Moisture Analyser along with all required accessories including inbuilt display shall be provided with each Transformer for measurement & analysis of dissolved gases and moisture in the oil. Interpretations shall be as per IEC 60599-1999.
- 1.2. The equipment shall detect, measure and analyse the following gases:

Gases & Moisture Parameters	Typical Detection Range
H ₂	5 – 5,000 ppm
CH ₄	5 – 5,000 ppm
C ₂ H ₆	5 – 5,000 ppm
C ₂ H ₄	3 – 5,000 ppm
C ₂ H ₂	1 – 3,000 ppm
CO	10 – 10,000 ppm
CO ₂	20 – 30,000 ppm
H ₂ O	2 – 100 % RS should have facility for measurement of moisture in oil in ppm

- 1.3. The analyser should measure (not calculate) all above gases and should have 100% sensitivity. The equipment shall be capable of transferring data to sub-station automation system confirming to IEC 61850. Necessary interface arrangement shall be provided by the contractor for integration with automation system. The necessary type test report for such confirmation shall be submitted during detailed engineering.
- 1.4. Equipment shall have facility to give SMS alert to at least three users whenever any fault gas violates the predefined limit.
- 1.5. Equipment should work on station auxiliary supply. In case other supply is required for the equipment then suitable converter shall be included. All the necessary power and control cables, communication cables, cable accessories as required shall be provided by the supplier.
- 1.6. Online DGA shall be installed out door on Transformer in harsh ambient and noisy condition (Electromagnetic induction, Corona, and capacitive coupling). Equipment shall be mounted separately on ground. Suitable arrangement shall be provided to support and protect the inlet and outlet piping arrangement. The connecting oil lines must be of Stainless Steel rigid pipes or flexible hoses. The equipment shall be suitable for proper operation in EHV substation (800kV) environment where switching takes place in the EHV/HV System. The suitable indications for power On, Alarm, Caution, normal operation etc. shall be provided on the front panel of the equipment. The equipment shall have IP55 Stainless Steel enclosure, suitable for 55 °C ambient temperature and EMI and EMC compatibility. The Equipment must carry a minimum of five (5) years manufacturer's Warranty.
- 1.7. The equipment shall display all the individual gas and moisture concentration on its display unit and shall have facility to download all the stored the data from the unit for further analysis. The sampling rate shall be selectable as 2 or 4 or 6 or 12 hours etc. The equipment shall have inbuilt memory to store these results for complete one year even if sampling is done at the lowest interval. The carrier and calibration gas (if applicable) shall have minimum capacity to work for at least three years without

replacement. All the consumable (if any) upto warrantee period shall be included in the scope of supply

1.8. The Equipment must have an automatic Calibration facility at fixed intervals. For calibration if anything required including cylinder must be mounted with the Equipment.

1.9. The technical feature of the equipment shall be as under:

Accuracy	+ 10%
Repeatability	+3% to 10% depending upon gases
Oil temperature range	- 20 ⁰ C to + 120 ⁰ C
External Temp. Range	- 20 ⁰ C to + 55 ⁰ C (External temp range of 55 ⁰ C is important and should not be compromise due to Indian ambient & operating conditions.)
Humidity range	10 to 95 %
Operating Voltage	230 Vac; 50 Hz (±20% variation)
Communications	USB&IEC 61850 compliant

1.10. Software for fault indication and fault diagnostics shall include following:
Fault indication:

- i) IEEE, IEC or user configurable levels of dissolved gases
- ii) Rate of change trending

Fault Diagnosis:

- i) Key gases
- ii) Ratios (Rogers, IEC. etc.)
- iii) Duval's Triangle

1.11. The equipment shall be supplied with all necessary accessories required for carrying out DGA of oil sample complete in all respect as per the technical specification. The following shall be also form a part of supply.

- i) Software
- ii) Operation Manual (2 set for every unit),
- iii) Software Manual and
- iv) Compact disc giving operation procedures of Maintenance Manual & Trouble shooting instructions.

1.12. The installation and commissioning at site shall be done under the supervision of OEM representative or OEM certified representative.

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